Chapter 4. Central Coast Hydrologic Region

Setting

The Central Coast Hydrologic Region extends from southern San Mateo County in the north to Santa Barbara County in the south (Figure 4-1 is a map and table of statistics that describe the region). The region includes all of Santa Cruz, Monterey, San Luis Obispo and Santa Barbara counties and parts of San Mateo, Santa Clara, San Benito, and Ventura counties. Many attributes define the Central Coast region including: the topography, many microclimates, the variety of agricultural products, and the picturesque coastline, valleys and communities that drive a thriving tourism economy.

Most of the Central Coast Region is within the coastal mountain ranges, which stretch from the northern part of the region into San Luis Obispo and Santa Barbara counties. The portion of the Coast Ranges nearest to the ocean is the Santa Lucia Range, where elevations of a few peaks exceed 3,000 feet. Inland Coast Ranges are comprised of the Gabilan and Diablo ranges in the north, the Cholame Hills in the center, and the Temblor and La Panza ranges in the south. The San Rafael and Sierra Madre mountains cover nearly three-quarters of Santa Barbara County. The southernmost quarter of Santa Barbara County is covered by the Santa Ynez Mountains, which are a component of another landform, the east-west trending Transverse Ranges. The mountains in eastern Santa Barbara County attain elevations of about 7,000 feet.

Lowlands in the region include narrow streambeds winding to the coast, coastal terraces and plains of varying sizes, and a few larger river valleys. The largest lowland near the coast is the Salinas Valley. Although less than 10 miles wide for most of its length, it stretches for 120 miles from the community of Moss Landing on Monterey Bay southeastward to near the community of Santa Margarita in San Luis Obispo County. Pajaro Valley is a smaller coastal valley adjacent to the Salinas Valley on the north side of Monterey Bay. Another large lowland near the coast is Santa Maria Valley, which straddles the Santa Maria River. Most of this valley is in Santa Barbara County, but a portion is also in San Luis Obispo County. The Salinas and Santa Maria valleys are the premier agricultural production areas of the Central Coast. Other significant interior lowlands include San Benito Valley in the far north, the inland Cuyama Valley shared by San Luis Obispo and Santa Barbara counties, and the Lompoc and Santa Ynez valleys in Santa Barbara County. The single largest lowland in the region is the Carrizo Plain in the eastern backcountry of San Luis Obispo County. The Carrizo Plain is a very wide basin on the otherwise fairly narrow but notorious San Andreas Fault Zone, which runs the length of the region.

The Central Coast's rivers generally have a northwest-southeast alignment, reflecting the topographic trend of the region's mountains and hills. The Pajaro, Carmel, and Salinas rivers drain the northern part of this region, the Estrella River and San Juan Creek are located in the central portion, and the Cuyama, Santa Maria, and Santa Ynez rivers are in the southern portion. All of the rivers within this hydrologic region drain into the Pacific Ocean.

Climate

The climate of the Central Coast region remains temperate all year due to its location adjacent to the Pacific Ocean. The Central Coast has a Mediterranean climate characterized by mild, wet winters and warm, dry summers. The regional climate is dominated by a strong and persistent high-pressure system that frequently lies off the Pacific coast. This Pacific High shifts northward or southward in response to

seasonal changes or the presence of cyclonic storms. Prevailing winds carry cool, humid marine air onshore. These northwest winds cause frequent fog and low clouds near the coast, particularly at night and in the morning in the late spring and early summer. San Benito County is the only county in the region that does not have a coastline. As a result, temperatures are often higher and fog less prevalent than in the other coastal counties.

January is the coolest month with an average high temperature of 59 degrees and low temperature of 41 degrees. September is the warmest month with 72 degrees as the average high temperature and 52 degrees lowest. In the northern part of the region, the best weather occurs in September and extends through the middle of November with a few days getting into the 80s and 90s. Summer temperatures are cool along the coast and warmer inland. In the winter, temperatures remain cool along the coast but become cooler inland. The year-round, frost-free climate of the coastal valleys makes them ideal for specialty crops such as strawberries and artichokes.

Annual precipitation -- usually rain -- in the region ranges from 14 to 45 inches. Most of the rain occurs between late November and mid April. The average annual precipitation near Salinas is about 14 inches. The southern interior basins usually receive 5 to 10 inches per year, with the mountain areas receiving more than the valley floors. The vineyard-growing areas throughout the region generally have summers that are long and cool due to the influence of the ocean. High-quality wine grapes thrive in this environment with very moderate climate all summer, with foggy mornings, bright sunshine through the afternoon, and very windy afternoons and early evenings.

The Monterey area, in general, enjoys the mildest climate with the fewest hot and cold days of any place in the continental United States. A prevailing feature of summer weather is the coastal fog or stratus overcast. The low overcast or fog usually burns off in the late morning and moves back in before midnight. During the winter, the coolest areas are inland away from the ocean. Winds are lightest in the winter and strongest in the summer, except for occasional storms.

The most prominent feature in the region is the floor of the Salinas Valley, which is about 7 miles wide at Chualar, 9 miles wide at Greenfield, and 4 miles wide at King City. The microclimate in these coastal areas (Salinas, Pajaro, and Santa Maria valleys) is ideal and they are known for growing lettuce, broccoli, mushrooms, strawberries, citrus, and several other crops. The microclimate in these coastal areas is also ideal for the floral industry and grape vineyards.

At the very southern end of the region is Santa Barbara County. Summers are warm and dry; the winters are cool and often wet. The county has a unique physical orientation, with a series of east-west transverse mountain ranges. This can sometimes produce a profound orographic effect when storms approach the county from the Pacific Ocean. Most rain occurs between November and March. For the most part, Santa Barbara County receives relatively gentle but steady rainfall during storm events. Moist air from the Pacific Ocean moderates temperatures in the coastal areas; while somewhat lower winter minimums and higher summer maximums prevail in the inland valleys.

Population

The population of the Central Coast Region was about 1,459,200 in 2000, slightly more than 4 percent of California's population. About 65 percent of the Central Coast population lives in incorporated cities,

which include Salinas (143,800), Santa Barbara (89,600), Santa Maria (77,400), Santa Cruz (54,600), San Luis Obispo (44,200), Lompoc (41,100), Watsonville (44,300), Hollister (34,400), Monterey (29,700), Atascadero (26,400), and Paso Robles (24,300). There are several communities in the region with populations of fewer than 20,000.

California experienced a population increase approaching 15 percent from 1990 to 2000, while the growth in Central Coast Region was nearly 14 percent. Most of the counties in the Central Coast region reached double-digit population growth rates during these 10 years. The only county with a growth rate below double digits, according to Department of Finance population statistics, was Santa Barbara County, which grew by slightly less than 9 percent. San Benito County exceeded all other counties by recording a 46 percent increase during the decade. The population growth rates for Monterey County, San Luis Obispo County and Santa Cruz County were 13 percent, 14 percent, and 12 percent, respectively. Looking to the future, current California Department of Finance projections estimate that the population of this hydrologic region will grow to roughly 1,890,400 by year 2030, which represents a 30 percent increase from 2000. Figure 4-2 provides a graphical depiction of the Central Coast Region's population from year 1960 through 2000, with projections to year 2030.

Population growth in the region is largely constrained by land-use policies, which limits the development of new housing. The cost of homes in most of the region is well above the national average, with the most costly real estate near the Santa Cruz and Monterey bays, Santa Barbara and greater Salinas area. As with most communities facing high real estate prices, there is a lack of entry and mid-level housing. Prices have been driven up by a lack of new development combined with a high demand by people moving into this region. The high cost of housing in the city of Santa Barbara is resulting in a 'flight to affordability,' as more workers are commuting into the city from nearby Santa Maria and the Santa Ynez Valley. Likewise, workers also commute to jobs in the major metropolitan areas from communities such as Salinas, Hollister and some locations in the San Joaquin Valley, including Tracy, Los Banos, Patterson, and Modesto.

Land Use

The busy topography of the Central Coast Region and distance from California's major population centers have resulted in a landscape that is primarily pastoral and agricultural. Major economic activities include tourism, agricultural-related processing, as well as government and service-sector employment. Oil production and transportation sites onshore and offshore are important to the economy.

Agriculture in the Central Coast region can be divided into two distinct categories. One is irrigated vegetable and specialty crops grown on coastal terraces and valleys and in some inland valleys; and the other category is range pasture and dry-farmed grain in the inland valleys. The acreage planted in wine grape is expanding rapidly, and now represents the region's highest-value individual agricultural commodity. Vineyard acreage regionwide grew 34 percent between 1998 and 2001. Although wine grapes are the highest value individual agricultural commodity in the region, the crop category for all vegetable crops still generate the highest dollar value. Livestock operations, mainly cattle, also are significant in the region.

Total irrigated land acreage in the Central Coast Region has only slightly increased from 422,000 acres in 1990 to 438,800 acres in 2000, or 4 percent. However, because of the significant increase in the practice of growing multiple crops per year on the same piece of land, the total crop acreage increased from

534,400 acres in 1990 to 605,000 acres in 2000, a 13 percent increase. This increase in farm productivity through multi-cropping is a practice that is applied primarily to vegetable crops.

The acreage of some field crops has been declining for several years. It is rare to find sugar beets grown in the region and the two processing plants in Spreckles and Santa Maria that used to take delivery of local sugar beets have both closed. Other field crops that have declined are corn, alfalfa, and irrigated pasture. However, the acreage of vegetable and truck crops has increased. As by the Monterey County Agricultural Commissioner, lettuce acreage was 58,000 acres in 1990, and by year 2000 it had increased to 106,000 acres. Value-added products such as packaged salads, baby lettuce mixes, and specialty bag mixes have created a large demand for the many types of lettuce grown in the region, as well as for specialty greens.

The two premier vegetable-growing centers in the region are the highly productive Salinas Valley in the north and the smaller Santa Maria Valley in the south. Year-round multiple cropping is the rule in these areas. The results from a multiple cropping field study conducted by the Department of Water Resources in the Salinas Valley in 1997 indicated that more than 100,000 acres was multiple cropped, which is about 40 percent of the irrigated land in the northern half of this hydrologic region.

The entire region was home in 2001 to over 250,000 acres of land devoted to the production of irrigated vegetables and specialty crops, and produced, through multiple cropping, over 400,000 acres of specialty crop products. From 1992 to 1998, the region lost more than 14,400 acres of agricultural land to urban uses (California Department of Conservation figures). However, growers have compensated for the agricultural land losses by increased multiple cropping and the use of non-irrigated pasture lands.

Citrus and subtropical fruit crops, chiefly avocados and some lemons, are grown on nearly 14,000 acres in the region, predominantly in the south. More than three-quarters of the acreage are near Santa Barbara. Also, nearly 14,000 acres of irrigated deciduous fruit trees, mostly walnuts, are grown in the region largely in San Luis Obispo and San Benito counties. Vineyard acreage is evenly distributed between the northern and southern parts of the region. However, the vineyard acreage in the southern areas has grown rapidly from 27,100 acres in 1998 to 46,500 acres in 2001. Total grape acreage for the full hydrologic region grew from 68,100 to 95,600 acres between 1998 and 2001. Wineries with tasting rooms have become an important part of the region's travel and tourism industry.

Publicly owned lands, including military reservations, federally managed areas, and parks, make up about 28 percent of the Central Coast Region. One of the main environmental water uses in the region is for the Salinas River National Wildlife Refuge, which is located on 366 acres where the Salinas River empties into Monterey Bay. The refuge is part of the San Francisco Bay National Wildlife Refuge Complex, headquartered in Fremont. Refuge lands include a range of terrestrial and aquatic habitats, including coastal dunes and beach, grasslands, wetlands, and riparian scrub. Because it is within the Pacific Flyway, the refuge is used by a variety of migratory birds for breeding, wintering, and during migrating. It also provides habitat for several threatened and endangered species.

Water Supply and Use

Groundwater is the primary source of water in the region, accounting for roughly 80 percent of the annual supply in 2000. Local and some imported surface water supplies make up the rest of the available water

for this region. A significant amount of groundwater recharge is provided by the Pajaro, Salinas, and Carmel rivers, and by the Arroyo Seco which flows into the Salinas River. Also, some water from local reservoirs is used to recharge groundwater. San Clemente and Los Padres dams on the Carmel River in Monterey County, San Antonio Dam on the San Antonio River, also in Monterey County, and Nacimiento Dam on the Nacimiento River in San Luis Obispo County are the region's main reservoirs. Figure 4-4 shows all of the water supply sources used to meet developed water uses in the region for 1998, 2000 and 2001.

Water agencies in the northern half of this region include Monterey County Water Resources Agency, Monterey Peninsula Water Management District, Marina Coast Water District, California-American Water Co., California Water Service Co., Sunnyslope County Water District, Pajaro Valley Water Management Agency, the city of Santa Cruz, and San Benito County Flood Control and Water Conservation District. Water agencies in the southern parts of the region include the San Luis Obispo County Flood Control and Water Conservation District and the Santa Barbara County Flood Control and Water Conservation District and numerous cities, special districts, community services districts, and public utility companies. The Central Coast Water Authority is a larger regional agency that includes many of the individual water entities as members.

Historically, almost all of the applied irrigation water was developed from groundwater until the San Felipe Unit of the U.S. Bureau of Reclamation's Central Valley Project began importing surface water for irrigation in June 1987. The CVP's contracts for deliveries to the Santa Clara Valley Water District and the San Benito County Water District through the San Luis Reservoir total 196,300 acre-feet per year, which includes 138,250 acre-feet per year for municipal use and 58,050 acre-feet per year for agricultural uses. There are two other USBR projects in the region. The Cachuma Project provides Santa Ynez River water to the communities of Carpinteria, Goleta, Montecito, Santa Barbara and Santa Ynez from the 190,000 acre-foot Cachuma Reservoir through the Tecolote Tunnel and South Coast Conduit. The USBR also operates the Santa Maria Project, which provides water from Twitchell Reservoir on the Cuyama River for irrigation purposes in the Santa Maria area. Another federal reservoir, the U.S. Army Corps of Engineer's 26,000 acre-foot Santa Margarita Lake provides water to the city of San Luis Obispo. Surface water is also imported into the region through the SWP's Coastal Branch Aqueduct, which was completed in 1997 and can deliver up to 70,500 acre-feet per year into San Luis Obispo and Santa Barbara counties. Figure 4-3 presents a bar chart that summarizes all of the dedicated and developed urban, agricultural and environmental water uses within this hydrologic region for years 1998, 2000 and 2001.

The California-American Water Co., which is the primary urban water supplier to about 100,000 residents on the Monterey Peninsula, currently obtains 71 percent of its water from wells in the Carmel Valley and Seaside groundwater aquifers. The remaining 29 percent is supplied from storage behind San Clemente and Los Padres dams on the Carmel River. In recent years, increases in urban water use have outpaced the available supplies, such that new water supply sources must be developed before additional regional growth can be supported. Although California-American Water Co. had previously proposed building of a new dam on the Carmel River, the company is now studying an alternative plan called the Coastal Water Project. This project proposes building an ocean desalination plant near Moss Landing, and development of a conjunctive groundwater storage program for the aquifer in the Seaside area. Additional planning studies, environmental impact analysis, and regulatory agency approvals must be completed before new water supply facilities can be completed.

Desalination of seawater is another source of water within this region. The 1987-92 drought resulted in the construction of several small seawater desalting plants. The city of Santa Barbara built an 8 million gallons per day plant that was to provide water during water shortages. However, this plant is now inactive and most of its equipment has been removed. A small plant also was built for the Department of Parks and Recreation at the San Simeon Beach State Park to serve the Hearst Castle Visitor's Center. That plant was removed when a surface water alternative was later also acquired. The city of Morro Bay built a seawater desalting plant and still operates it intermittently during water shortages.

Today, there are seven small seawater-desalting plants along the Central Coast. Of these, only one, Marina Coast Water District, is in continuous use to provide municipal water. The other six provide water for offshore islands or for industrial use. Four more seawater desalting plants of greater than 1 million gallons per day capacity are in various stages of planning. If built as planned, these four plants could produce about 19.2 million gallons per day, or about 20,000 acre-feet per year. The plants under consideration include Santa Cruz, 2.5 million gallons per day; Moss Landing, 9 million gallons per day; Marina Coast expansion by 2.7 million gallons per day; and Morro Bay, 5 million gallons per day as a private development. There are other smaller plants also being considered for the Monterey and Cambria areas.

Water recycling is also becoming a more important water resource. For example, Santa Barbara County has three wastewater treatment plants that recycle wastewater for irrigation, and dust control and compaction at construction sites. In addition, Laguna Sanitation District is designing wastewater treatment and recycled water distribution plants that will be used to serve a golf course and several other irrigation water customers in the city of Santa Maria.

Table 4-2 provides information about the water and its uses in the region for 1998 (a very wet year), 2000 (a year with close to normal precipitation), and 2001 (a below average year for most of the State). Table 4-3 shows agriculture is the main user of water in this region, accounting for roughly 70 percent of the region's total water use in 2000, an average water year. Environmental water use consists primarily of the river flows from two federally designated wild and scenic rivers, the Big Sur River and the Sisquoc River. Because the flow of these two rivers varies considerably depending on the type of water year, total environmental water use can be as much as 25 percent of all uses in a wetter year (1998), or as little as 5 percent of the total water use in a drier year. Urban water use is currently about 21 percent of the total developed and dedicated water uses in the Central Coast region.

Per capita urban water use in many parts of the region remains at or below urban usage levels from the late 1980s. This decline can be traced to the aggressive use of water conservation programs and mandatory reductions during the 1987-1992 drought. The city of Santa Barbara is good example. Shortages from one of its major supplies, the Cachuma Reservoir Project, forced the city to intensify its conservation and rationing. In 1988, the average daily per capita water use for Santa Barbara was estimated at 164 gallons per day. That value dropped to 94 gallons per capita day during the worst part of the drought in 1990. More recently for year 2000, the estimated value was 133 gallons per day, which is still about 20 percent lower than per capita usage in 1988. Similar trends toward improved water conservation have occurred in many other urban areas of the Central Coast Region.

State of the Region

Challenges

With the Central Coast's limited surface water supply and few large surface water storage facilities, the growing demand for water is leading to more dependence on groundwater. Because groundwater is taken out faster than it can be replenished in some of the coastal aquifers, seawater has pushed into some coastal freshwater aquifers and is degrading water quality. There are some places, such as the Seaside Groundwater Basin and the Carmel River Groundwater Basin in the Monterey Peninsula Water Management District, where seawater intrusion has been prevented by rigorous monitoring and management to limit groundwater well production to safe yields. However, in other coastal areas such as the mouth of the Salinas River, seawater intrusion into the groundwater aquifer is a major threat to water quality.

Unique coastal resources, such as Morro Bay and Monterey Bay, as well as the Salinas Valley, are the focus of water quality issues. Sedimentation poses the greatest water quality threat to Morro Bay, one of 28 estuaries in the National Estuary Program. The bay is also contaminated by pathogens from agriculture, boats, and urban runoff; nutrients from fertilizers, animal wastes, and urban runoff; and heavy metals from abandoned mines in the upper watershed, and offshore boatyards contaminate sediment. Elevated levels of bacteria have closed many of the shellfish growing beds in Morro Bay, and have occasionally closed beaches in Santa Cruz County and southern Santa Barbara County. To protect special areas of biological significance, waste discharges are prohibited or limited in portions of Monterey Bay, a National Marine Sanctuary, and other specific coastal and ocean waters of the region. In its triennial review, the Central Coast Regional Water Quality Control Board also identified the need to incorporate new microbiological standards for water contact recreation.

The Salinas River watershed has significant nitrate contamination related to agriculture, the valley's main land use. Groundwater overdraft is also a problem in the area, and seawater has now intruded 6 miles inland into the shallow groundwater aquifer around Castroville. The nearby Pajaro River watershed faces a variety of water quality threats, such as erosion (primarily from agricultural practices), urban runoff, sand and gravel mining, flood control projects, off-road vehicles, and historical mercury mining in the Hernandez Lake area. Coastal wetlands in Elkhorn Slough, a tributary to Monterey Bay between the Salinas and Pajaro rivers , suffers from erosion on strawberry and other cropped lands in its watershed. Elevated bacterial levels in the slough may be associated with a large dairy and waste operation in the watershed as well as septic tanks. In addition, more than 600 year-round vessels use the Moss Landing Harbor, and increasing the waste load to the slough. The accumulated effects of these water quality problems, along with the resuspension of pesticides in sediments, have restricted shellfish growing in Elkhorn Slough.

Beyond the Salinas Valley, other regional water quality concerns include one of the nation's worst oil spills at Unocal's Guadalupe Oil Field in the Santa Maria River watershed. Nutrients and pathogens impact the San Lorenzo River basin, from septic systems, horse corrals, and urban runoff, as well as erosion from logging, urban development, and road maintenance. Groundwater basins that are impacted by salinity include the Hollister area, the Carrizo Plain, the Santa Maria and Cuyama valleys, San Antonio Creek Valley, portions of the Santa Ynez Valley, and the Goleta and Santa Barbara areas.

The California-American Water Co. is the primary water supplier to most of the Monterey Peninsula, and the Carmel River is its primary source of water. In 1995, a major State Water Resources Control Board decision ruled that the company did not have a legal right to roughly 70 percent of the surface water it had been diverting from the Carmel River. As a result, Cal-Am has been forced to take more water from wells that draw from groundwater below the lower valley, in order to keep as much water as possible in the river. Relatively little surface water is now taken from the river's two reservoirs behind the San Clemente and Los Padres dams. To offset this loss of surface water Cal-Am and the Monterey Peninsula Water Management District have each made separate proposals for seawater desalination plants that would produce enough water to satisfy the state order — and put about 8,000 acre-feet of water a year back into the Carmel River. However, as currently proposed neither project will be able to supply water for future urban growth and in-fill housing needs.

Accomplishments

Many water districts have programs to monitor, evaluate, and better manage their groundwater resources. Watershed programs are under way to reduce non-point pollution, reduce stream erosion, and improve riparian vegetation. For example, the Coastal Watershed Council was formed in response to the declining health of the watersheds of the Monterey Bay. Its mission is to restore the watersheds of the region and teach its residents how to become stewards of their creeks and streams.

The Carmel River Basin, though small compared to other watersheds, supports a key run of steelhead, a federally listed species. The Monterey Peninsula Water Management District has a program to offset the environmental effects of diversions from the Carmel River that are required to meet the peninsula’s water needs. Activities include steelhead rescues when the river is dry, fish rearing and release, restoring riparian habitat, and protecting riverbanks. MPWMD works with others, including the Carmel River Steelhead Association and the Carmel River Watershed Council.

In January 2003, Pajaro Valley water officials negotiated a $25 million agreement for water to be piped from the Central San Joaquin Valley’s Broadview Water District near the city of Firebaugh in Fresno County. Because of drainage and economic problems, Broadview district farmers have allowed about one-third of their 9,100 acres to lay fallow in recent years, while selling part of their CVP water deliveries. An agreement, which is part of the Pajaro Valley Water Management Agency's plan to use imported water to halt over-pumping and, thus, seawater intrusion, would provide water to local growers who raise crops on thousands of acres in the Pajaro Valley. Negotiations between Pajaro Valley and Broadview WD continued into 2004; but unfortunately the deadline to complete an agreement passed without a final pact being negotiated. Subsequently, Westlands Water District initiated discussions with Broadview Water District for the purchase of District lands and CVP water. In a notice it sent to District landowners in September of 2004, Westlands stated that the negotiations had been completed and it hoped to finalize the agreement by February of 2005. Pajaro Valley’s negotiations with Broadview WD marked their second attempt to purchase CVP water rights. In 1999, it acquired 6,250 acre-feet from the Mercy Springs Water District, also in the Central San Joaquin Valley.

In 1998, the Monterey County Water Resources Agency and the Monterey Regional Water Pollution Control Agency (RWPCA) completed a $78 million Salinas Valley reclamation project and Castroville seawater intrusion project. These two projects consist of a 19,500 acre-feet per year tertiary treatment plant and a distribution system that provides about 13,000 acre-feet of recycled water to 12,000 acres of Castroville area farms. During periods of the low irrigation demand in the winter, early spring and late

fall, this recycled water supplies most of the water needed for irrigation. These projects will reduce groundwater pumping in the project area, and thus are expected to reduce seawater intrusion. Another project that will help alleviate Salinas Valley's seawater intrusion is the $18.8 million Salinas Valley Water Project. The project has two parts: (1) a seasonal rubber dam on the Salinas River near Marina to deliver more fresh water to the saltwater-plagued areas near Castroville and (2) the modification of upstream river operations at San Antonio and Nacimiento lakes to provide higher summer flows to recharge Salinas Valley aquifers. Final planning, financing and permit approvals are currently being obtained, and it is anticipated that this project will be constructed in year 2005.

Relationship with Other Regions

Historically, the communities of the Central Coast region have relied on local surface and groundwater supplies to meet their needs. The northern part of the region first received imported water with completion of the San Felipe Unit of the federal CVP in 1987. This facility delivers water primarily for agricultural purposes from San Luis Reservoir in the San Joaquin River Hydrologic Region. Ten years later, the Coastal Branch of the SWP was completed to import water to San Luis Obispo and Santa Barbara counties from the California Aqueduct in the Tulare Lake Hydrologic Region. There are no other water imports into the Central Coast region. Because there is seldom any excess surface water in this region's watersheds, there are no water exports from this region to other parts of the State.

Looking to the Future

Local water agencies in the Central Coast Region are continually maintaining, servicing, expanding, and updating their water systems. Because groundwater is the primary water source for the Central Coast Region, water agencies are actively combining groundwater and surface water components into conjunctive use projects. In addition to the implementation of water conservation programs, other water management strategies that are under consideration include recycling, groundwater recovery, water marketing and desalination.

Ongoing Planning Efforts

- Salinas Valley Water Plan
- Pajaro Valley Groundwater Management Plan
- Pajaro River Watershed Council
- Coastal Watershed Council
- Upper Salinas River Watershed CRMP
- Carmel River Watershed Council
- Carmel River Management Plan
- Seaside Basin Groundwater Management Plan

Regional Planning

Several water agencies, including Marina Coast Water District and Scotts Valley Water District, are developing groundwater management plans and conducting groundwater studies to fill in information gaps about local groundwater conditions.

In its effort to implement its Basin Management Plan (BMP) Alternative B, the Pajaro Valley Water Management Agency (PVWMA) has purchased rights to CVP water from the Mercy Springs WD (6,250 acre-feet). The PVWMA has also begun pipeline construction to deliver Harkins Slough Project and supplemental well water to coastal growers whose wells have been contaminated by seawater, and is pursuing more than $50 million in State and federal grants to implement the BMP. The BMP includes

new wells, as a supplemental supply and as a source of blend water for wastewater reclamation, and an injection/recovery program for Central Valley Project water.

The Monterey Peninsula Water Management District (MPWMD) has carried out a multiyear aquifer storage and recovery test program, where excess winter flow from the Carmel River is treated and injected into the Seaside Basin for recovery during dry periods. MPWMD has also funded several hydrogeologic studies of the Seaside Basin, and is in the early phases of developing a Seaside Basin Groundwater Management Plan.

Many projects and studies are under way in the Central Coast Region to enhance water quality and supply. Several new ocean desalination plants, such as the desalination project in the Sand City area being studied by Monterey Peninsula Water Management District, are being investigated as potential sources of new water supplies. Many agencies are also considering recycled water projects in conjunction with the construction of new or expanded municipal wastewater treatment plants. Local water users are proposing to raise the height of USBR's Bradbury Dam (Cachuma Reservoir) up to 3 feet to provide more water supply for the enhancement of downstream fish habitat. Additionally, many watershed programs are underway to remediate pollution and sedimentation, to help flood control, and to protect and restore ecosystems.

Water Portfolios for Water Years 1998, 2000, and 2001

Water Portfolio for Water Year 1998

California experienced a very wet winter in 1998 related to El Nino weather. Because of the extensive damage caused by El Nino storms, this winter ranked as the 10th costliest in California history. Particularly hard hit were the coastal valleys, where many agricultural fields remained wet and soggy for the first six months of 1998. Annual rainfall in the Santa Cruz area exceeded 30 inches (193.5 percent of normal), while in the southern part of this region the Santa Barbara NWS station measured almost 47 inches of rainfall (167 percent of normal). For the entire hydrologic region, average annual precipitation was 225 percent of normal amounts, compared to a statewide average of 171 percent of normal annual precipitation.

Total agricultural production in the region was $3.65 billion (Monterey, Santa Cruz, San Benito, San Luis Obispo, and Santa Barbara counties) in 1998 from 564,600 acres of harvested irrigated crops. This is only a modest increase over 1997, but it is significant considering some of the challenges that the agricultural industry faced. Most of the farming along the Central Coast involves vegetable crops, and vegetable crop acreage accounted for 72 percent of all irrigated crop acreage. The next largest crop is vineyard comprising 12 percent of irrigated crop acreage. The Salinas Valley area produces the majority of the spring and summer vegetable crops, particularly lettuce.

The impact of the wet El Nino phenomenon on the Central Coast Region's precipitation was very significant. Growers had little need to irrigate crops during the first four to five months of 1998. The very wet conditions prevented the timely planting of many acres of truck crops. Spring rains delayed planting and negatively affected growing conditions, especially impacting head lettuce production. There was also a decrease in wine grape value due primarily to the cool wet conditions while acreage continued to increase. Strawberry acreage was slightly less than the prior year, but total strawberry crop value rose due to a shortage early in the season, resulting in higher prices once the berries were harvested. The most

significant increase in 1998 was attributed to salad products, which were up about $70 million as consumer demand grew. Head lettuce value significantly dropped primarily as a result of wet spring conditions.

As shown in Table 4-3 the 1998 total on-farm agricultural applied water use in the Central Coast Region was 816,300 acre-feet while total agriculture use was 829,000 acre-feet, or 58 percent of all uses, which is lower than normal as a result of the heavy precipitation. On a per acre basis, the average on-farm unit applied water was only 1.4 acre foot per acre in 1998. As would be expected, this information verifies that the amount of water needed to irrigate crops is generally much less than normal during years with very wet winters. The total agricultural evapotranspiration of applied water, or ETAW, in 1998 amounted to 564,000 acre-feet. The regional average unit ETAW was 1 acre-feet per acre.

Total urban applied water, including residential, commercial, industrial, and landscape uses, in the region was 261,500 acre-feet for the year. As shown in Table 4-3, urban water use accounts for roughly 18 percent of the region's total water use. Based on available water agency information, the average per capita water use was about 164 gallons per day during this wet year. Since a significant portion of urban water is used for outdoor landscapes, parks and golf courses, the per capita water use is lower than normal during a wet year. Total urban ETAW was 64,800 acre-feet.

Total environmental water demand, including instream flows, wild and scenic rivers, and refuge water diversions, for the region was about 339,000 acre-feet in 1998. This accounts for about 24 percent of total developed water uses for this year. Within the Central Coast region, most of this environmental water is dedicated to the wild and scenic river flow requirements for the Big Sur River and the Sisquoc River.

Total water supplies, including local and imported (CVP and SWP) surface water, groundwater, and reuse, amounted to 1.4 million acre-feet.

Water Portfolio for Water Year 2000

The weather of water year 2000 in the Central Coast region was very close to normal conditions. Rainfall amounts decreased in a southerly direction with Santa Cruz precipitation at 118 percent of average (36.4 inches), Salinas at 110 percent of average (16.5 inches), Santa Maria at 113 percent of average (14.6 inches) and Santa Barbara at 121 percent of average (21.3 inches). For the entire hydrologic region, average annual precipitation was 110 percent of normal, compared to a statewide average of 97 percent of normal.

Water storage in the Central Coast watersheds was reported as above normal. Average reservoir storage on May 1 was 115 percent of normal with runoff to May 1 measured at 105 percent of normal. The land acreage used for irrigated agricultural continued the past trend of remaining relatively stable. Crop acreage, however, increased 7 percent from 1998 to 2000 to a total of 605,000 acres. This increase in crop acreage is due to expanded use of the practice of growing multiple crops per season on the same piece of land. The estimated amount of multiple cropping in 2000 increased 5 percent and is reflected in the increased acreage of truck crops of 7 percent above 1998 amounts. Truck crops comprised about 72 percent of total crop acreage in this region, while the next largest crop category, vineyard, comprised 15 percent of total acreage.

The year 2000 on-farm agricultural applied water in the Central Coast Region was 999,400,, acre-feet and total agricultural water use was 1,016,300 or 71 percent of all uses. This amounts to 22 percent more applied water than was estimated in 1998 and is considered to be more representative of agricultural water use under normal hydrologic conditions. Average on-farm unit applied water in 2000 was 1.7 acre-feet per acre, compared to 1.4 acre-feet per acre in 1998. The total agricultural evapotranspiration of applied water, or ETAW, in 2000 amounted to 679,900 acre-feet, 21% more than 1998. The regional average unit ETAW was 1.1 acre-feet per acre.

Total urban applied water for the region was 295,700 acre-feet, which was 13 percent higher than the total applied water for 1998. Average per capita water use was about 181 gallons per day, which is also slighter higher than 1998 usage. Urban applied water accounts for about 21 percent of the total water use in the region. Total population in the region for the 2000, was 1,459,200, which is an increase of about 3.6 percent over the 1998 population. When compared to the 1998 wet year, the above increases in urban water use are primarily due to significantly less rainfall in year 2000 than that of 1998, which means that more urban water was needed for outdoor landscape, parks and golf courses. Total urban ETAW was 73,300 acre-feet, 3% more than 1998.

Total environmental demand (instream, wild and scenic, and refuges) for the region was about 124,700 acre-feet, a significant 63% less than 1998. This accounts for about 8 percent of total developed and dedicated water uses during year 2000. This is water that is reserved for instream and wild and scenic river flows, which are generally higher in the wetter years (like 1998) and become lower in average and drier years. Total water supplies, including local and imported (CVP and SWP) surface water, groundwater, and reuse, amounted to 1.4 million acre-feet, about the same as 1998.

Water Portfolio for Water Year 2001

The weather of water year 2001 in the Central Coast Region ranged between normal conditions to slightly below normal precipitation. The total rainfall recorded in Santa Cruz was 82 percent of average (25.4 inches), Salinas at 90 percent of average (13.5 inches), King City at 116 percent of average (12.8 inches) and Santa Barbara at 146 of average (23.5 inches). For the entire hydrologic region, average annual precipitation was 107 percent of normal, compared to a statewide average of 72 percent. The winter season 2001 was characterized by a lack of rainfall across the region during October through December.

Surface water runoff in the watersheds of the Central Coast region was reported as below average, with accumulated runoff to May 1 measured at 70 percent of average. However reservoir storage on May 1 was 135 percent of average because of significant storage carryover from the previous year. Total cropped acreage in 2001 was 601,900 acres, which was very similar to year 2000. In 2000, the prices of many of the core crops grown in the region had increased significantly. However, in 2001, many of these same crops had lower production and price declines. Head lettuce, broccoli, cauliflower, and celery production all experienced decreases in 2001.

The year 2001 on-farm agricultural applied water in the Central Coast region was 1,152,100,acre-feet and the total agriculture water use was 1,170,800 acre-feet or 76 percent of all uses. This amounts to 41 percent more agricultural water use than 1998 and 15 percent more than 2000. Average on-farm unit applied water use per acre also increased in 2001 to 1.9 acre-feet per acre compared to 1.4 acre-feet per

acre in 1998 and 1.7 in 2000. As the above data confirms, the need for agriculture water increases as the amount of winter precipitation received decreases from 1998 (wet) to 2000 and 2001. The total agricultural evapotranspiration of applied water, or ETAW, in 2001 amounted to 785,900 acre-feet, 41% more than 1998 and 15% more than 2000. The regional average unit ETAW was 1.3 acre-feet per acre.

In 2001, total urban applied water for the region was 293,900 acre-feet, which was about 12 percent more than 1998 and 1 percent less than year 2000. Average per capita water use was around 176 gallons per day. Urban water use accounted for about 19 percent of the total water use in the region. Total population in the region for the 2001, was about 1,476,800, an increase of 1.2 percent in comparison to the 2000 population. Total urban ETAW was 74,200 acre-feet, 2% more than 1998 but 1% less than 2000.

Dedicated environmental water use (instream, wild and scenic flows, and refuges) for the region dropped to 84,800 acre-feet in 2001, 75% less than 1998 and 32% less than 2000. This accounts for about 5 percent of total developed water uses during this year, and reflects the lower wild and scenic flow volumes in the Big Sur River and the Sisquoc River.

Total supplies, including local and imported (CVP & SWP) surface water, groundwater, and reuse, amounted to 1.5 million acre-feet in 2001, which is an 8 percent increase from 1998 and 2000.

Water Portfolio Table 2-2 and the three companion Water Portfolio flow diagrams (Figures 2-5, 2-6 and 2-7) provided more detailed information about how the available water supplies are distributed and used on a region-wide basis.

Sources of Information

- Water Quality Control Plan, Regional Water Quality Control Board
- Watershed Management Initiative Chapter, Regional Water Quality Control Board
- 2002 California 305(b) Report on Water Quality, State Water Resources Control Board
- Bulletin 118 (Draft), California's Groundwater, Update 2003, Department of Water Resources
- Nonpoint Source Program Strategy and Implementation Plan, 1998-2013, State Water Resources Control Board, California Coastal Commission, January 2000
- Strategic Plan, State Water Resources Control Board, Regional Water Quality Control Boards, November 15, 2001
- The Californian, Salinas
- San Luis Obispo County Tribune
- Monterey County Herald

Figure 4-1
Central Coast Hydrologic Region

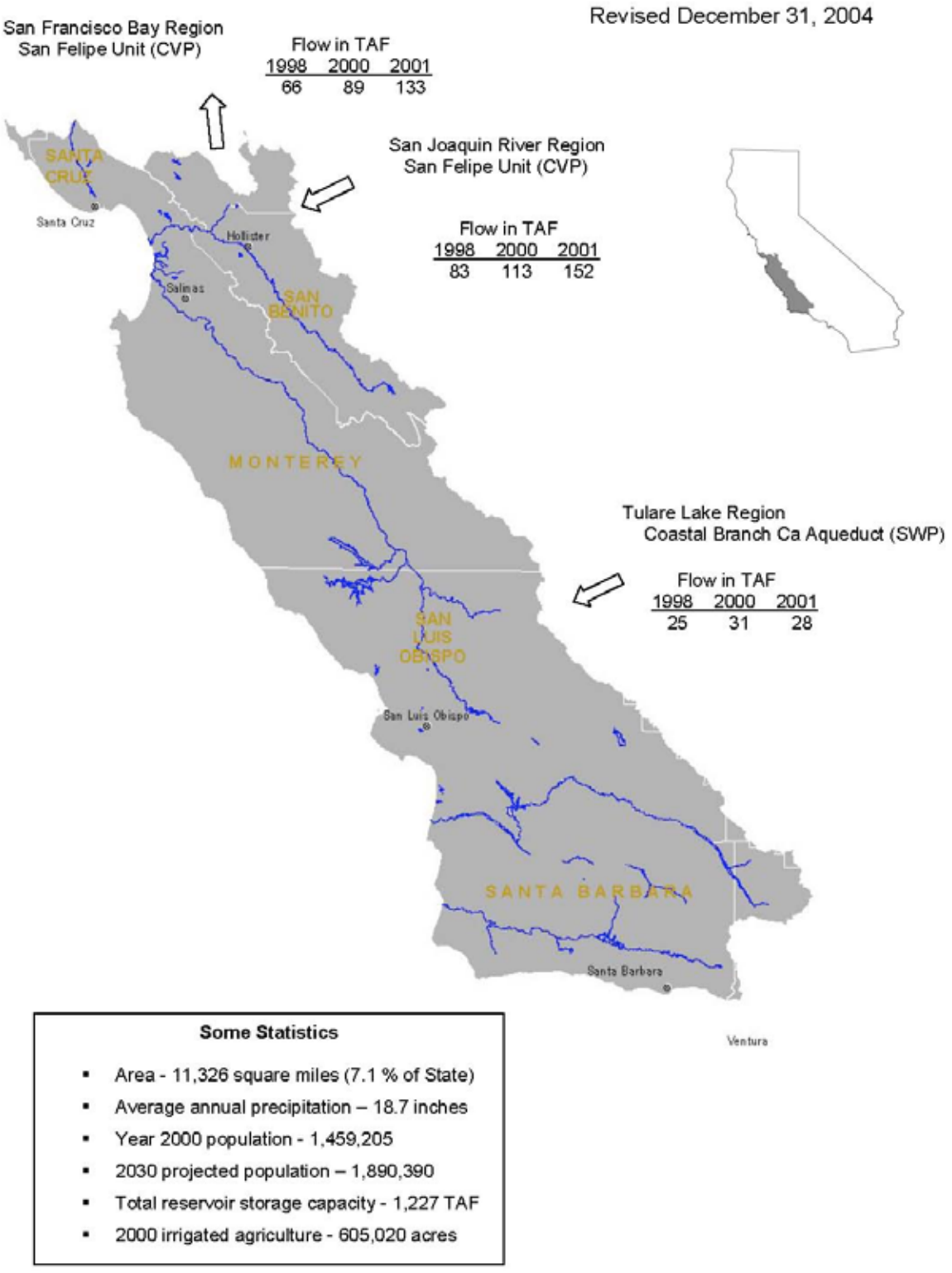

Figure 4-2
Central Coast Hydrologic Region Population

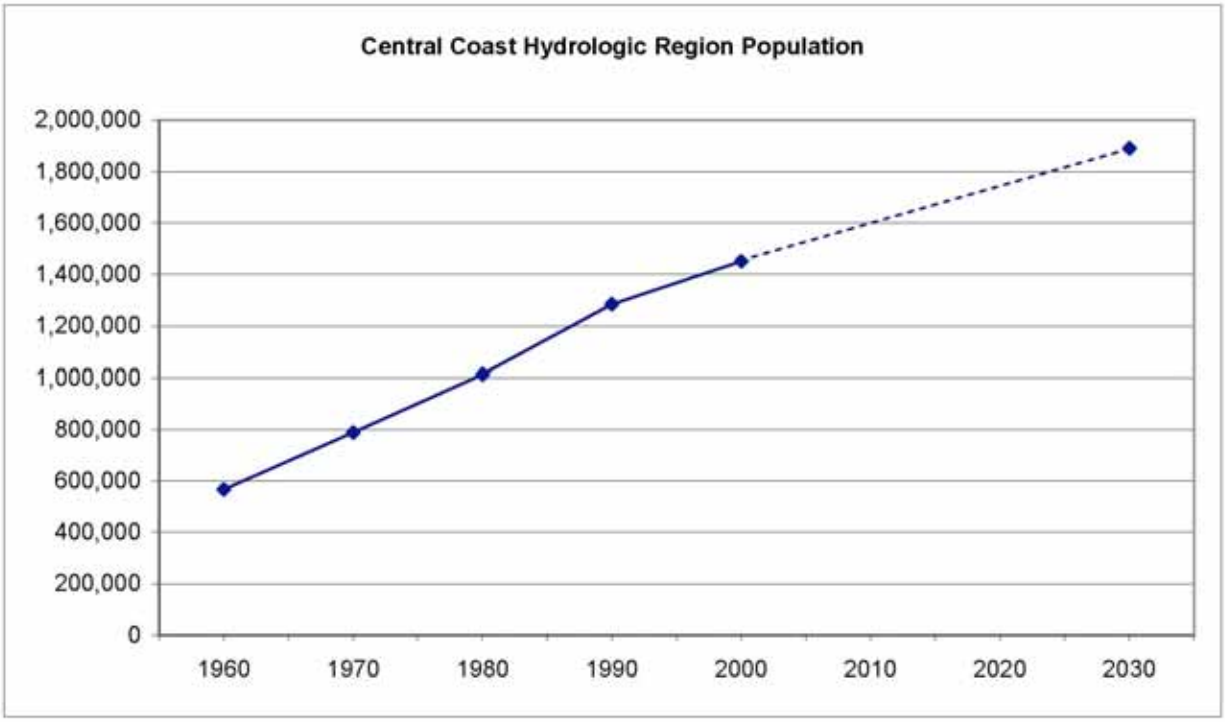

Figure 4-3
Central Coast Region Applied Water Uses For Water Years 1998, 2000, 2001

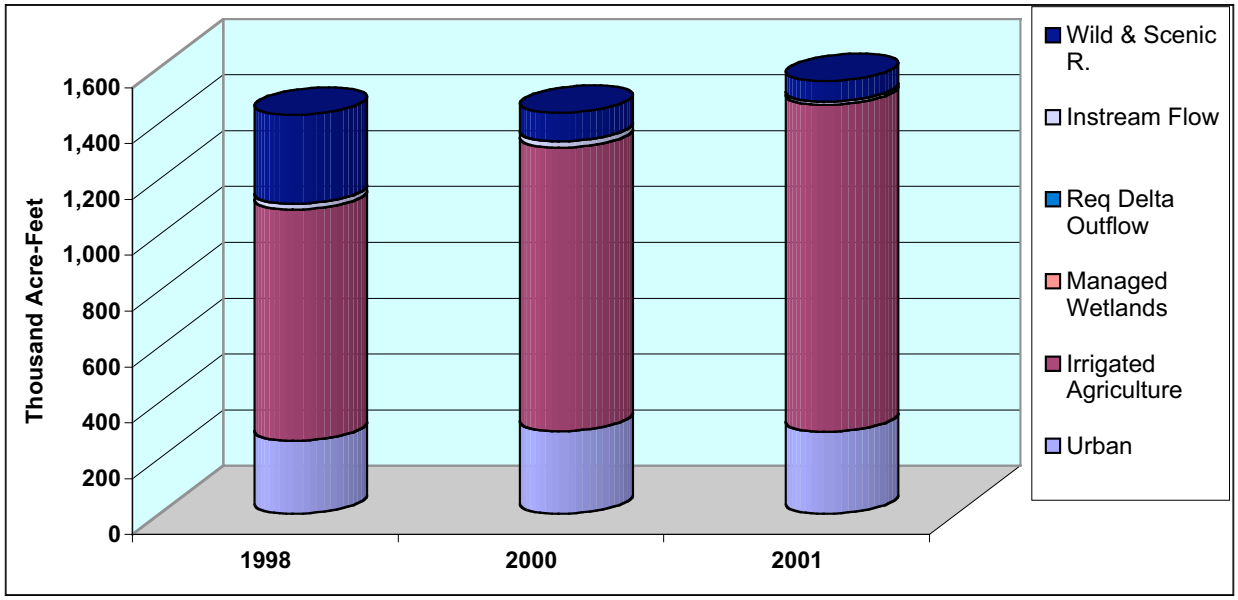

Figure 4-4
Central Coast Region Dedicated Water Supplies For Water Years 1998, 2000, 2001

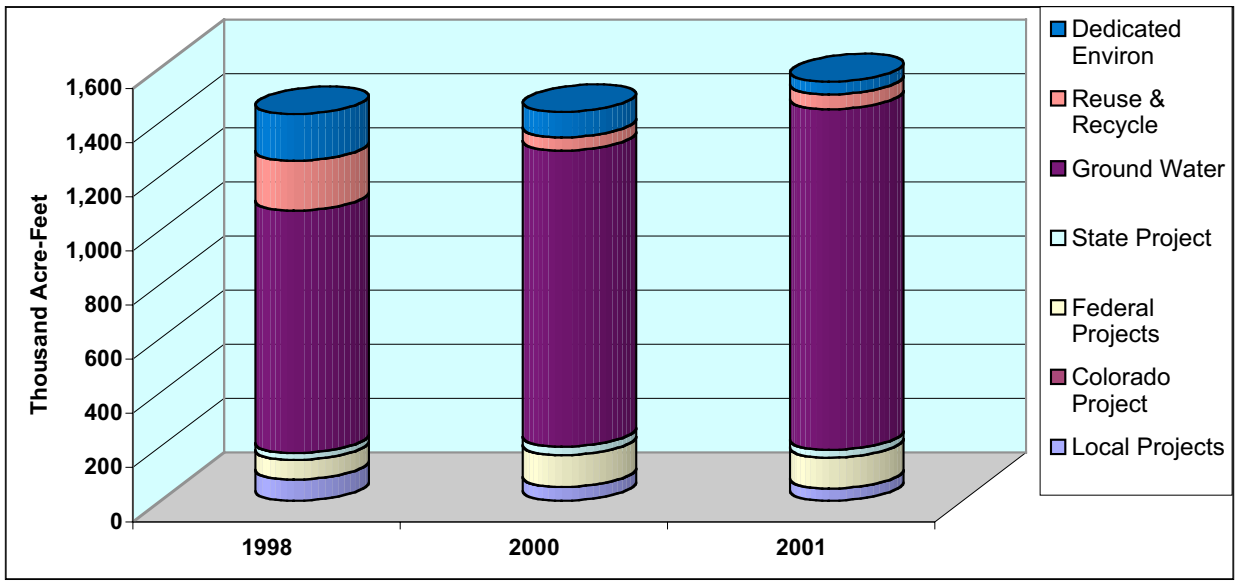

Table 4-1
Central Coast Hydrologic Region Water Balance Summary – TAF

Water Entering the Region – Water Leaving the Region = Storage Changes in Region

	Water Year (Percent of Normal Precipitation)		
	1998 (225%)	2000 (110%)	2001 (107%)
Water Entering the Region			
Precipitation	25,202	12,596	11,848
Inflow from Oregon/Mexico	0	0	0
Inflow from Colorado River	0	0	0
Imports from Other Regions	108	144	180
Total	**25,310**	**12,740**	**12,028**
Water Leaving the Region			
Consumptive Use of Applied Water * (Ag, M&I, Wetlands)	622	754	860
Outflow to Oregon/Nevada/Mexico	0	0	0
Exports to Other Regions	66	89	133
Statutory Required Outflow to Salt Sink	174	95	49
Additional Outflow to Salt Sink	154	181	183
Evaporation, Evapotranspiration of Native Vegetation, Groundwater Subsurface Outflows, Natural and Incidental Runoff, Ag Effective Precipitation & Other Outflows	24,502	12,362	11,688
Total	**25,518**	**13,481**	**12,913**
Storage Changes in the Region [+] Water added to storage [–] Water removed from storage			
Change in Surface Reservoir Storage	401	8	-14
Change in Groundwater Storage **	-609	-749	-871
Total	**-208**	**-741**	**-885**

Applied Water * (compare with Consumptive Use) * Definition - Consumptive use is the amount of applied water used and no longer available as a source of supply. Applied water is greater than consumptive use because it includes consumptive use, reuse, and outflows.	1,074	1,291	1,442

**Footnote for change in Groundwater Storage

Change in Groundwater Storage is based upon best available information. Basins in the north part of the State (North Coast, San Francisco, Sacramento River and North Lahontan Regions and parts of Central Coast and San Joaquin River Regions) have been modeled – Spring 1997 to Spring 1998 for the 1998 water year and Spring 1999 to Spring 2000 for the 2000 water year. All other regions and Year 2001 were calculated using the following equation:

GW change in storage =
intentional recharge + deep percolation of applied water + conveyance deep percolation – withdrawals

This equation does not include the unknown factors such as natural recharge and subsurface inflow and outflow

Table 4-2
Water Portfolios for Water Years 1998, 2000 and 2001

Category	Description	Central Coast 1998 (TAF)				Central Coast 2000 (TAF)				Central Coast 2001 (TAF)				Data
Inputs:		Water Portfolio	Applied Water	Net Water	Depletion	Water Portfolio	Applied Water	Net Water	Depletion	Water Portfolio	Applied Water	Net Water	Depletion	**Detail**
1	Colorado River Deliveries		-				-				-			PSA/DAU
2	Total Desalination		-				-				-			PSA/DAU
3	Water from Refineries		-				-				-			PSA/DAU
4a	Inflow From Oregon		-				-				-			PSA/DAU
b	Inflow From Mexico		-				-				-			PSA/DAU
5	Precipitation	25,201.6				12,596.4				11,847.9				REGION
6a	Runoff - Natural	N/A				N/A				N/A				REGION
b	Runoff - Incidental	N/A				N/A				N/A				REGION
7	Total Groundwater Natural Recharge	N/A				N/A				N/A				REGION
8	Groundwater Subsurface Inflow	N/A				N/A				N/A				REGION
9	Local Deliveries		79.2				51.1				46.0			PSA/DAU
10	Local Imports		-				-				-			PSA/DAU
11a	Central Valley Project :: Base Deliveries		-				-				-			PSA/DAU
b	Central Valley Project :: Project Deliveries		18.1				58.8				59.7			PSA/DAU
12	Other Federal Deliveries		54.1				61.4				54.6			PSA/DAU
13	State Water Project Deliveries		24.8				30.9				28.0			PSA/DAU
14a	Water Transfers - Regional		-				-				-			PSA/DAU
b	Water Transfers - Imported		-				-				-			PSA/DAU
15a	Releases for Delta Outflow - CVP		-				-				-			REGION
b	Releases for Delta Outflow - SWP		-				-				-			REGION
c	Instream Flow Applied Water		20.3				21.4				10.8			REGION
16	Environmental Water Account Releases		-				-				-			PSA/DAU
17a	Conveyance Return Flows to Developed Supply - Urban		-				-				-			PSA/DAU
b	Conveyance Return Flows to Developed Supply - Ag		-				-				-			PSA/DAU
c	Conveyance Return Flows to Developed Supply - Managed Wetland		-				-				-			PSA/DAU
18a	Conveyance Seepage - Urban		-				-				-			PSA/DAU
b	Conveyance Seepage - Ag		-				-				-			PSA/DAU
c	Conveyance Seepage - Managed Wetlands		-				-				-			PSA/DAU
19a	Recycled Water - Agriculture		-				-				-			PSA/DAU
b	Recycled Water - Urban		17.5				18.1				18.5			PSA/DAU
c	Recycled Water - Groundwater		-				-				-			PSA/DAU
20a	Return Flow to Developed Supply - Ag		-				-				-			PSA/DAU
b	Return Flow to Developed Supply - Wetlands		-				-				-			PSA/DAU
c	Return Flow to Developed Supply - Urban		-				-				-			PSA/DAU
21a	Deep Percolation of Applied Water - Ag		210.7				254.0				295.9			PSA/DAU
b	Deep Percolation of Applied Water - Wetlands		-				-				-			PSA/DAU
c	Deep Percolation of Applied Water - Urban		76.9				89.6				90.7			PSA/DAU
22a	Reuse of Return Flows within Region - Ag		-				-				-			PSA/DAU
b	Reuse of Return Flows within Region - Wetlands, Instream, W&S		165.4				29.9				36.2			PSA/DAU
24a	Return Flow for Delta Outflow - Ag		-				-				-			PSA/DAU
b	Return Flow for Delta Outflow - Wetlands, Instream, W&S		-				-				-			PSA/DAU
c	Return Flow for Delta Outflow - Urban Wastewater		-				-				-			PSA/DAU
25	Direct Diversions	N/A				N/A				N/A				PSA/DAU
26	Surface Water in Storage - Beg of Yr	589.1				770.2				778.5				PSA/DAU
27	Groundwater Extractions - Banked	-				-				-				PSA/DAU
28	Groundwater Extractions - Adjudicated	-				-				-				PSA/DAU
29	Groundwater Extractions - Unadjudicated	897.0				1,093.8				1,258.1				REGION
Withdrawals:	**In Thousand Acre-feet**													
23	Groundwater Subsurface Outflow	N/A				N/A				N/A				REGION
30	Surface Water Storage - End of Yr	990.1				778.5				764.5				PSA/DAU
31	Groundwater Recharge-Contract Banking		-				-				-			PSA/DAU
32	Groundwater Recharge-Adjudicated Basins		-				-				-			PSA/DAU
33	Groundwater Recharge-Unadjudicated Basins		-				-				-			REGION
34a	Evaporation and Evapotranspiration from Native Vegetation				N/A				N/A				N/A	REGION
b	Evaporation and Evapotranspiration from Unirrigated Ag				N/A				N/A				N/A	REGION
35a	Evaporation from Lakes				10.0				11.6				10.9	REGION
b	Evaporation from Reservoirs				74.2				75.9				71.5	REGION
36	Ag Effective Precipitation on Irrigated Lands		214.0				170.6				156.8			REGION
37	Agricultural Water Use		816.3	605.6	593.5		999.4	745.4	730.5		1,152.1	856.2	841.1	PSA/DAU
38	Managed Wetlands Water Use		0.1	0.1	0.1		0.1	0.1	0.1		0.1	0.1	0.1	PSA/DAU
39a	Urban Residential Use - Single Family - Interior		69.3				83.7				87.1			PSA/DAU
b	Urban Residential Use - Single Family - Exterior		42.9				53.1				54.5			PSA/DAU
c	Urban Residential Use - Multi-family - Interior		32.6				37.5				34.0			PSA/DAU
d	Urban Residential Use - Multi-family - Exterior		13.4				15.9				15.6			PSA/DAU
40	Urban Commercial Use		47.7				52.6				50.0			PSA/DAU
41	Urban Industrial Use		23.7				24.0				23.7			PSA/DAU
42	Urban Large Landscape		13.7				10.4				10.3			PSA/DAU
43	Urban Energy Production		14.3				14.3				14.3			PSA/DAU
44	Instream Flow		20.3	-	-		21.4	-	-		10.8	-	-	PSA/DAU
45	Required Delta Outflow		-	-	-		-	-	-		-	-	-	PSA/DAU
46	Wild and Scenic Rivers		318.6	173.5	173.5		103.2	94.7	94.7		73.9	48.5	48.5	PSA/DAU
47a	Evapotranspiration of Applied Water - Ag				556.9				681.0				785.9	PSA/DAU
b	Evapotranspiration of Applied Water - Managed Wetlands				0.1				0.1				0.1	PSA/DAU
c	Evapotranspiration of Applied Water - Urban				64.8				73.3				74.2	PSA/DAU
48	Evaporation and Evapotranspiration from Urban Wastewater				-				-				-	REGION
49	Return Flows Evaporation and Evapotranspiration - Ag				2.0				4.2				4.9	PSA/DAU
50	Urban Waste Water Produced	68.0				79.7				75.0				REGION
51a	Conveyance Evaporation and Evapotranspiration - Urban				11.3				12.7				12.4	PSA/DAU
b	Conveyance Evaporation and Evapotranspiration - Ag				11.8				14.7				16.7	PSA/DAU
c	Conveyance Evaporation and Evapotranspiration - Managed Wetlands				-				-				-	PSA/DAU
d	Conveyance Loss to Mexico				-				-				-	PSA/DAU
52a	Return Flows to Salt Sink - Ag				33.6				46.3				51.3	PSA/DAU
b	Return Flows to Salt Sink - Urban				120.6				135.0				131.7	PSA/DAU
c	Return Flows to Salt Sink - Wetlands				-				-				-	PSA/DAU
53	Remaining Natural Runoff - Flows to Salt Sink				173.5				94.7				48.5	REGION
54a	Outflow to Nevada				-				-				-	REGION
b	Outflow to Oregon				-				-				-	REGION
c	Outflow to Mexico				-				-				-	REGION
55	Regional Imports	108.2				143.7				180.3				REGION
56	Regional Exports	65.8				88.9				132.7				REGION
59	Groundwater Net Change in Storage	-608.5				-749.0				-870.5				REGION
60	Surface Water Net Change in Storage	401.0				8.3				-14.0				REGION
61	Surface Water Total Available Storage	1,226.8				1,226.8				1,226.8				REGION

Colored spaces are where data belongs. N/A - Data Not Available "-" - Data Not Applicable "0" - Null value

Table 4-3
Central Coast Hydrologic Region Water Use and Distribution of Dedicated Supplies

	1998			2000			2001		
	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion
WATER USE									
Urban									
Large Landscape	13.7			10.4			10.3		
Commercial	47.7			52.6			50.0		
Industrial	23.7			24.0			23.7		
Energy Production	14.3			14.3			14.3		
Residential - Interior	101.9			121.2			121.1		
Residential - Exterior	56.3			69.0			70.1		
Evapotranspiration of Applied Water		64.8	64.8		73.3	73.3		74.2	74.2
Irrecoverable Losses		24.3	24.3		26.8	26.8		25.8	25.8
Outflow		103.7	103.7		116.7	116.7		113.9	113.9
Conveyance Losses - Applied Water	3.9			4.2			4.4		
Conveyance Losses - Evaporation		3.9	3.9		4.2	4.2		4.4	4.4
Conveyance Losses - Irrecoverable Losses		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Losses - Outflow		0.0	0.0		0.0	0.0		0.0	0.0
GW Recharge Applied Water	0.0			0.0			0.0		
GW Recharge Evap + Evapotranspiration		0.0	0.0		0.0	0.0		0.0	0.0
Total Urban Use	**261.5**	**196.7**	**196.7**	**295.7**	**221.0**	**221.0**	**293.9**	**218.3**	**218.3**
Agriculture									
On-Farm Applied Water	816.3			999.4			1,152.1		
Evapotranspiration of Applied Water		556.9	556.9		681.0	681.0		785.9	785.9
Irrecoverable Losses		3.0	3.0		4.2	4.2		4.9	4.9
Outflow		33.6	33.6		45.3	45.3		50.3	50.3
Conveyance Losses - Applied Water	12.7			16.9			18.7		
Conveyance Losses - Evaporation		11.8	11.8		14.7	14.7		16.7	16.7
Conveyance Losses - Irrecoverable Losses		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Losses - Outflow		0.0	0.0		1.0	1.0		1.0	1.0
GW Recharge Applied Water	0.0			0.0			0.0		
GW Recharge Evap + Evapotranspiration		0.0	0.0		0.0	0.0		0.0	0.0
Total Agricultural Use	**829.0**	**605.3**	**605.3**	**1,016.3**	**746.2**	**746.2**	**1,170.8**	**858.8**	**858.8**
Environmental									
Instream									
Applied Water	20.3			21.4			10.8		
Outflow		0.0	0.0		0.0	0.0		0.0	0.0
Wild & Scenic									
Applied Water	318.6			103.2			73.9		
Outflow		173.5	173.5		94.7	94.7		48.5	48.5
Required Delta Outflow									
Applied Water	0.0			0.0			0.0		
Outflow		0.0	0.0		0.0	0.0		0.0	0.0
Managed Wetlands									
Habitat Applied Water	0.1			0.1			0.1		
Evapotranspiration of Applied Water		0.1	0.1		0.1	0.1		0.1	0.1
Irrecoverable Losses		0.0	0.0		0.0	0.0		0.0	0.0
Outflow		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Losses - Applied Water	0.0			0.0			0.0		
Conveyance Losses - Evaporation		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Losses - Irrecoverable Losses		0.0	0.0		0.0	0.0		0.0	0.0
Conveyance Losses - Outflow		0.0	0.0		0.0	0.0		0.0	0.0
Total Managed Wetlands Use	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Environmental Use	**339.0**	**173.6**	**173.6**	**124.7**	**94.8**	**94.8**	**84.8**	**48.6**	**48.6**
TOTAL USE AND LOSSES	**1,429.5**	**975.6**	**975.6**	**1,436.7**	**1,062.0**	**1,062.0**	**1,549.5**	**1,125.7**	**1,125.7**
DEDICATED WATER SUPPLIES									
Surface Water									
Local Deliveries	79.2	79.2	79.2	51.1	51.1	51.1	46.0	46.0	46.0
Local Imported Deliveries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Colorado River Deliveries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CVP Base and Project Deliveries	18.1	18.1	18.1	56.8	56.8	56.8	59.7	59.7	59.7
Other Federal Deliveries	54.1	54.1	54.1	61.4	61.4	61.4	54.6	54.6	54.6
SWP Deliveries	24.8	24.8	24.8	30.9	30.9	30.9	28.0	28.0	28.0
Required Environmental Instream Flow	173.4	173.4	173.4	94.7	94.7	94.7	48.4	48.4	48.4
Groundwater									
Net Withdrawal	608.5	608.5	608.5	749.0	749.0	749.0	870.5	870.5	870.5
Artificial Recharge	0.0			0.0			0.0		
Deep Percolation	288.5			344.8			387.6		
Reuse/Recycle									
Reuse Surface Water	165.4			29.9			36.2		
Recycled Water	17.5	17.5	17.5	18.1	18.1	18.1	18.5	18.5	18.5
TOTAL SUPPLIES	**1,429.5**	**975.6**	**975.6**	**1,436.7**	**1,062.0**	**1,062.0**	**1,549.5**	**1,125.7**	**1,125.7**
Balance = Use - Supplies	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*

Figure 4-5
Central Coast Hydrologic Region 1998 Flow Diagram
In Thousand Acre-Feet (TAF)

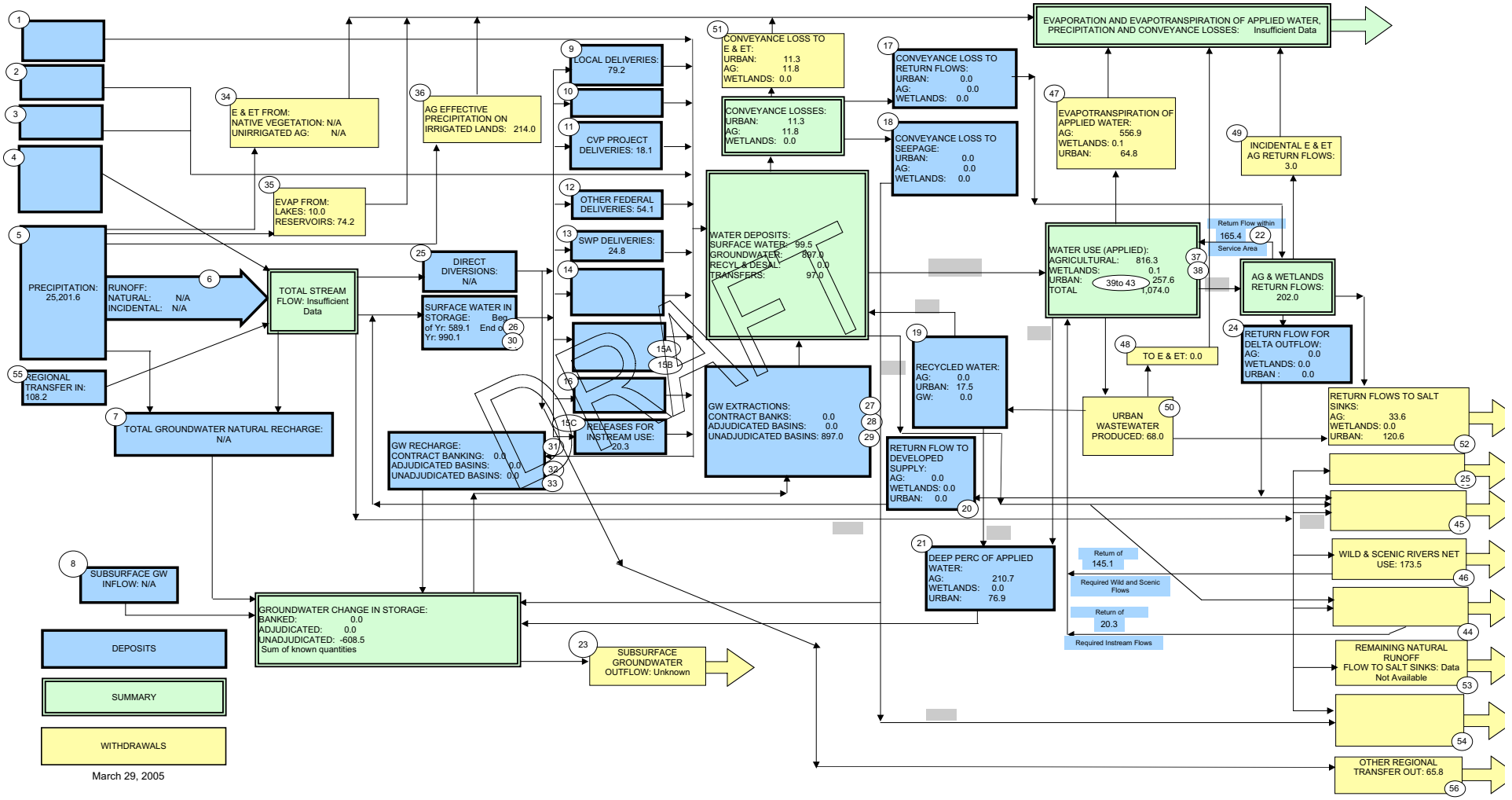

Figure 4-6
Central Coast Hydrologic Region 2000 Flow Diagram
In Thousand Acre-Feet (TAF)

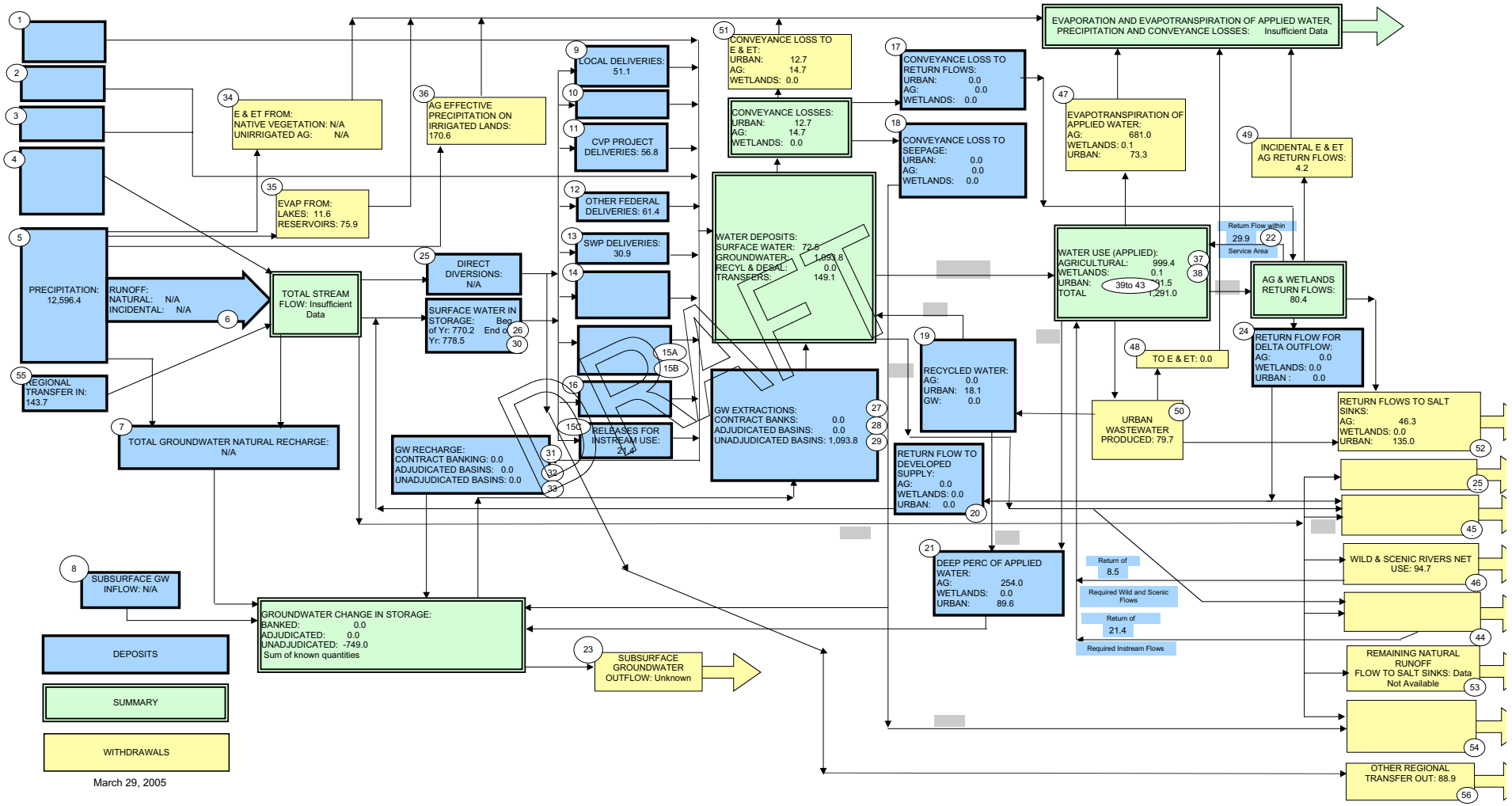

Figure 4-7
Central Coast Hydrologic Region 2001 Flow Diagram
In Thousand Acre-Feet (TAF)